Inequality and Opportunity in a Perfect Storm of Graduate Student Debt

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Abstract

Recent efforts to understand aggregate student loan debt have shifted the focus away from undergraduate borrowing and toward dramatically rising debt among graduate and professional students. We suggest educational debt plays a key role in social stratification by either deterring bachelor's degree holders from disadvantaged and underrepresented backgrounds from pursuing lucrative careers through advanced degree programs or imposing a high cost for entry. We speculate that the ongoing personal financing of advanced degrees, changes to funding in higher education, and increasing returns to and demand for post-baccalaureate degrees have created a perfect storm for those seeking degrees beyond college. We find that aggregate increases in borrowing among advanced degree students between 1996 and 2016 can be explained in part by increasing enrollment rates, particularly among master's degree students, and large, secular increases in graduate and professional students' undergraduate and graduate borrowing. In contrast to undergraduate debt alone, the burden of educational debt among graduate borrowers appears to have fallen on students from lower socioeconomic backgrounds and historically underserved students of color more so than their more advantaged counterparts and on women more so than men. However, we also find that median advanced degree wage premia over those of bachelor's degree holders are substantial for many who graduate with advanced degrees, but are particularly high for African American and low-SES graduates, complicating simple conclusions about the stratification of debt at the post-graduate level.

Keywords: class inequality, higher education, quantitative research on education, race, status attainment

Inequality and Opportunity in a Perfect Storm of Graduate Student Debt

Jaymes Pyne and Eric Grodsky

Reports of increases in student loan debt have received widespread attention in recent years, with estimates of total student debt in the United States nearing or topping $1.5 trillion in the first quarter of 2018 (Federal Reserve System 2018; Scally 2018). Although most public and academic attention to mounting education debt has focused on undergraduate students, some have argued that concerns about undergraduate debt are overstated (Akers and Chingos 2016; Elvery 2017; Looney and Yannelis 2015; Pyne and Grodsky 2018). Contrary to the narrative in mainstream media, many of the young adult borrowers at risk of default hold modest amounts of debt but failed to complete their degrees, complicating repayment, or chose to attend high-cost, low-aid schools (Baum 2016; Valentine and Grodsky 2015). Recent evidence, however, indicates an increasing share of student loan debt is accruing at the graduate degree level, with graduate degree holders accounting for as much as 40% of the trillion-dollar figure (Delisle 2014; Looney and Yannelis 2015). This rapid increase in debt among graduate degree holders has been accompanied by sweeping changes in federal graduate student lending over time, including increasing take-up of Grad PLUS loans and alternative repayment plans like income-driven repayments or public service loan forgiveness (College Board 2017a).

In this paper, we suggest that the financing of post-baccalaureate education may play an important role in contemporary social stratification. Although bachelor's degree holders have large advantages in the labor market compared to those with less education, we argue that a combination of institutional forces and individual opportunities may burden some less-advantaged students with higher levels of graduate debt and exclude others from enrolling in graduate and professional programs altogether. While we lack adequate data to provide a strong test of these ideas, we deploy the data available to us to describe the changing landscape of graduate and professional student debt in general and among first-generation students and students of color in particular. These emergent patterns suggest a pressing problem of equity among the more advantaged that may inhibit the capacity of African American professionals to pass on the advantages they have secured to their children.

Using three nationally-representative data sources, we document trends in graduate program debt and test for stratified debt outcomes, differentiating among graduate students by parents' highest level of education, student's race/ethnicity, gender, degree, and field of study. We ask:

1. How has debt among graduate students changed over time overall and across degree level, field of study, and graduate school sector?
2. Has the burden of debt among graduate students changed over time across levels of parental education and race?
3. Are returns to graduate and professional degrees sufficiently large to justify the costs to obtain them? If so, for whom?

First, we find recent aggregate increases in debt among graduate students is likely attributable to a combination of increasing enrollment, a higher proportion of students borrowing for their education, and large increases in the amount students borrow. Increases in enrollment and aggregate debt are especially pronounced for those earning master's degrees. In contrast to trends in undergraduate debt, educational debt among graduate students who borrow has fallen disproportionately on those historically least advantaged and/or underserved: students of color, first-generation college students and women. African American graduate students in particular have been more likely to borrow over time and more likely to borrow much larger amounts than white students in recent years. At the same time, the returns to graduate and professional credentials have increased quite dramatically (Autor 2014, Lemieux 2008, Valletta 2016). The relative graduate degree wage premium is especially high among African American advanced degree-holders, bringing them on par with earnings of observationally similar white advanced degree-holders. These relatively high returns may make graduate and professional degrees a sound investment for students from historically excluded groups (Scott-Clayton and Li 2016), but the additional levels of debt they assume to get there may nonetheless have implications for long-run patterns of social stratification.

Collectively, the results we present point to an important and largely untapped frontier in the study of educational stratification. While we lack compelling data to uncover the underlying processes that produce the disparities we observe, we offer two potential explanations. First, following Dougherty (1994), we suggest an *institutional* explanation whereby universities act as 'constrained entrepreneurs' seeking to maximize revenue in the face of multiple constraints. This institutional action creates a perfect storm for stratified debt at the post-graduate level when combined with: a) the generally-held view that graduate education is a private and not public good, and b) the increasing returns to graduate credentials. Dwyer (2018) offers a complementary explanation for disparities in debt, outlining a theory for how debt may contribute to social stratification and hinder intergenerational (and perhaps intragenerational) mobility. She notes that access to different levels and terms of credit can be mobility-enhancing (under favorable terms) or debilitating (under unfavorable terms). We offer an amendment to Dwyer, suggesting that graduate student debt may inhibit mobility not necessarily because the terms are unfavorable to students from historically marginalized groups (though that may be the case), but because the level of debt is so large relative to their more advantaged peers.

In the following section, we briefly discuss recent trends in student debt at the undergraduate and graduate/professional levels and discuss standing questions from current literature related to racial and socioeconomic inequalities in educational debt patterns. Following an outline of our research questions and rationale for directing our attention to graduate student debt, we present empirical results concerning debt increases and inequality at the graduate school level and returns to advanced degrees. We conclude by discussing the implications of these findings and offer recommendations for future research.

Graduate Student Debt and Inequality

The amount of national borrowing for higher education has increased significantly since the late 1990s, with a substantial portion due to rising shares of debt held by graduate degree seekers (Delisle 2014). Only recently have researchers begun to consider how the financing of graduate education might reinforce or reduce social stratification. Corresponding to increasing demand for advanced degrees have been sharp increases in sticker prices for those degrees, an increase in take-up of Grad PLUS loans and a flagging in state funding for higher education (College Board 2017a; College Board 2017b). Lack of assistance at the state level, coupled with funding challenges within institutions (Kim and Otts 2010; Woo and Shaw 2015), leave students to bear a substantially higher debt burden to complete their graduate training than to earn their bachelor's degrees.

At the same time, returns to graduate and professional degrees are rising. With stagnating returns to bachelor's degrees in recent decades (Ashworth and Ransom 2019; Valletta 2016), graduate education has become a more important avenue for achieving elite status (Posselt and Grodsky 2017). As the payoffs to these credentials have grown, students likely have been more willing to bear higher costs to earn them. Because graduate and professional students have limited access to grant and scholarship aid, those enrolled in advanced degree programs are more likely than undergraduates to pay at or near the sticker price for their degrees (Woo and Shaw 2015). Large and prohibitive borrowing for graduate school could thus jeopardize greater net returns to advanced credentials relative to the net returns to a bachelor's degree alone.

Given these trends in graduate student borrowing and returns to degrees, several unanswered questions emerge. First, the degree to which family socioeconomic background influences borrowing among graduate students is still unclear. Socioeconomic background can contribute to differences in debt among students due in part to the financial, human and social resources parents can provide for their children's college education (Carneiro and Heckman 2002; Long 2008; Schneider, Hastings and LaBriola 2018) and by influencing students' choices of degree program and institution (Mullen, Goyette and Soares 2003; Reay 2005). At the undergraduate level, evidence is mixed; parental education and family income either predict borrowing amounts across-the-board (Furquim et al. 2017) or simply predict who *ends up* borrowing anything for college (Houle 2014). There are reasons to believe parental education and family income do affect the amount graduate students borrow, in part by driving borrowing at the undergraduate level through college selectivity and by influencing the types of graduate programs students choose to enter.

Second, we seek to clarify whether advanced degree racial gaps in borrowing vary by program type. Marked increases in rates of postsecondary and post-baccalaureate attendance for students of color have contributed to their increased risk of educational debt. Between 1995 and 2016, the proportion of enrolled college-aged African Americans rose eight percentage points at degree-granting institutions in general (Brey et al. 2019) and within professional-degree level law and medicine programs (Anderson 2002; Hurtado 2002). We know undergraduate racial debt gaps exist because African American students are more likely than white students to *enter* borrowing to pay for college (Goldrick-Rab, Kelchen and Houle 2014), and consequently borrow an average of $7,500 more than white students for similar degrees (Scott-Clayton and Li 2016). At least part of

this disparity is attributable to many African American bachelor's degree holders' borrowing for graduate school (Baum and Steele 2018). Black-white disparities in student debt tend to increase through early adulthood and are partially explained by differences in socioeconomic background and current adult socioeconomic status (Houle and Addo 2018).

Third, we are unsure of the extent to which social origin conditions the returns to graduate credentials by credential type. Due to repayment burdens, educational debt may reduce the returns to investments for advanced degrees, even if labor market outcomes for advanced degree holders are consistent across demographic groups (Chapman and Lounkaew 2015; College Board 2017b; Dynarski and Scott-Clayton 2013). The amount and proportion of debt that will overburden graduates depends on multiple factors, including age and family responsibilities, other concurrent debts, and cost-of-living (Baum and Schwartz 2006).

Recent research suggests returns to graduate and professional degrees may in fact vary by social origins (Torche 2011), setting the stage for potential racial/ethnic disparities in returns to graduate credentials. We know less about racial disparities among those earning graduate or professional degrees, but some recent evidence suggests an advantage in relative (though not absolute) returns to graduate and professional degrees for African American students (Scott-Clayton and Li 2016). This advantage may vary across fields of study (e.g., comparing findings of Donn, Cahill and Mihal 2015 in law school to findings by Ly, Seabury and Jena 2016 in medical school). In general, (and to our surprise) there are very few studies of racial disparities in the returns to graduate and professional education.

Current Study

Despite previous findings above, the literature would benefit from more research describing how graduate student debt has changed over time, how it is distributed among graduate students, and whether the returns on graduate school investment justify the costs borne by individual students. We seek to answer three research questions. First, we ask: How has debt among graduate students changed over time overall and across degree level, field of study, and graduate school sector? This first question establishes whether trends in educational expansion and competition for higher credentials provides context for the latter two research questions, which are meant to engage more directly with issues of stratification and social closure in post-baccalaureate education. Second, we ask: Has the burden of debt among graduate students changed over time across race and levels of parental education? Although we cannot be certain, the clear advantages of obtaining advanced degrees might mean advantaged parents are more likely to subsidize their children's graduate school costs at levels they hadn't previously. Concurrently, less-advantaged students primarily use loans for investing in social mobility through education and take on ever-higher burdens of debt to keep pace (Dwyer 2018). Finally, considering inequalities in borrowing we observe, we ask: Are returns to graduate and professional degrees sufficiently large to justify the costs to obtain them? If so, for whom? We build this argument by discussing how inequality in debt holdings among students of different demographic groups sets the stage for continued stratification among those with advanced degrees.

Data and Measures

We draw from three nationally representative data sources (see Appendix A for details) and we report all sample sizes below rounded to the nearest ten, in accordance with Institute for Education Sciences guidelines. First, we analyze the 1992 and 2016 panels of the Survey of Consumer Finances data to examine changes in household student loan debt, differentiated by the highest degree held in the household. The advantage of these data is that they include educational debt held by individuals in households that represent all degree levels – not just advanced degree-holders. These household debt data are self-reported, leading us to potentially underestimate actual debt amounts (Brown et al. 2015). However, since our interest is in trends rather than absolute debt amounts, we proceed under the assumption that the accuracy of people's reports of their levels of debt is not correlated with year of reporting or degree type. The final samples consist of 19,510 observations for the 1992 cohort and 31,240 observations for the 2016 cohort.

Second, we examine the 1996, 2004, and 2016 cohorts of the National Postsecondary Student Aid Study to look at borrowing patterns among graduate students over time. We first differentiate between graduate students who do and do not borrow over their postsecondary careers, whether borrowing in undergraduate and/or graduate school. Next, we measure the amount graduate students borrow conditional on borrowing any amount, converting all loan amounts to 2016 dollars using the Consumer Price Index for All Urban Consumers. Student loan information comes from both student interviews and the National Student Loan Data System (NSLDS). Debt reports thus exclude PLUS and private loans. In some analyses, we distinguish between debt accrued for undergraduate and graduate education. We restrict our sample to graduate students who are U.S. citizens near or past the amount of time in their program required to complete their degree type: second-year students or higher for master's degrees and third-year students or higher for all doctoral and professional degrees. Because we do not know each students' actual graduation year, these figures likely underestimate borrowing amounts for each of the cohorts. The general pattern of findings we report is consistent whether we restrict the sample to first-year advanced degree students only or fourth-year and higher doctorate and professional students. Sample reduction due to missing data is minimal in the 2004 and 2016 cohorts (<3% for both). However, about 44% of observations in the 1996 sample are missing parent education information. The final samples consist of about 2,600 observations in the 1996 cohort (N=1,460 in analytic models), 4,270 in the 2004 cohort, and 9,310 in the 2016 cohort. The unweighted number of borrowers in each cohort are roughly 1,160 (80%) in 1996, 2,970 (63%) in 2004, and 7,170 (79%) in 2016.

We distinguish among three degree programs in many of our analyses: professional, academic doctoral, and master's degrees. For certain analyses, we construct a seven-category typology based on level of degree and program type: Medical and health professionals; law professionals; academic doctorates; and master's degrees separated by business administration, science/technology/engineering/math/health, education, and a final category for all other master's degrees. Highest parental education level includes four categories: high school or less, some college, bachelor's degree, and master's degree or higher. Race is a five-category variable,

differentiating among white, African American, Latinx, Asian American, and all other races and ethnicities. Institutional sectors include public, private nonprofit, and private for-profit colleges and universities.

Third, we use 2013 National Survey of College Graduates data to estimate advanced degree earners' combined undergraduate and graduate borrowing and earnings at different stages of their careers. To measure student loan borrowing, we use self-reported undergraduate and graduate debt at the time of the interview for those graduating from 2009 to 2013. National Survey of College Graduates student loan data come in categorical dollar ranges, which are capped at $90,000 for undergraduate and graduate borrowing. We take the median value for each category (e.g., $15,000 for the $10,000 to $20,000 range) and sum across undergraduate and graduate borrowing. Self-reported borrowing can lead analysts to underestimate debt amounts (Brown et al. 2015). However, aggregate borrowing amounts in the National Survey of College Graduates are consistent with more reliable National Postsecondary Student Aid Study results, except among the highest borrowers (see Results section for details).

We measure respondents' salaries using self-report data from the 2013 interview. Baum and Schwartz (2006) recommend a repayment benchmark of 10 percent payment to median incomes to avoid defaulting on loans, pointing out that payments should never exceed 20% of earnings. We use both benchmarks when assessing payments and expected median earnings in these data. We also differentiate graduates' borrowing by their degree (master's, academic doctoral, professional) and their salaries by degree and time since earning their highest degree (0–5 years, 6–10 years, 11–15 years, 16–20 years). To measure debt of recent graduates we use data from the 9,560 respondents who graduated with advanced degrees from 2009 to 2013 and borrowed for their education. To measure expected earnings over time we use data from 36,030 respondents in the sample with reported earnings and years since graduation.

Finally, we use 2013 National Survey of College Graduates data to look at the wage premia of advanced degrees over a bachelor's degrees in 2013 across levels of postsecondary education by race and ethnicity. We do not impose sample restrictions based on year of degree completion but rather include controls for age and its quadratic. The final sample for wage premia analyses includes 86,820 baccalaureate and advanced degree graduates.

Analytic Strategy

To answer research question 1, we begin by comparing typical levels of household student debt across all levels of the highest degree attained in the household over the last 20 years. We then disaggregate borrowing patterns of graduate students in two ways. First, we examine the distribution of debt among all students enrolled in graduate degree programs, whether they borrowed to pay for higher education or not. Second, we divide each cohort's borrowers into deciles to estimate debt for students across the borrowing distribution and evaluate the ratio of 2004 and 2016 debt levels to 1996 levels of debt. Third, we differentiate among professional, doctoral, and all master's programs to identify how the share of graduate debt has changed across degree levels.

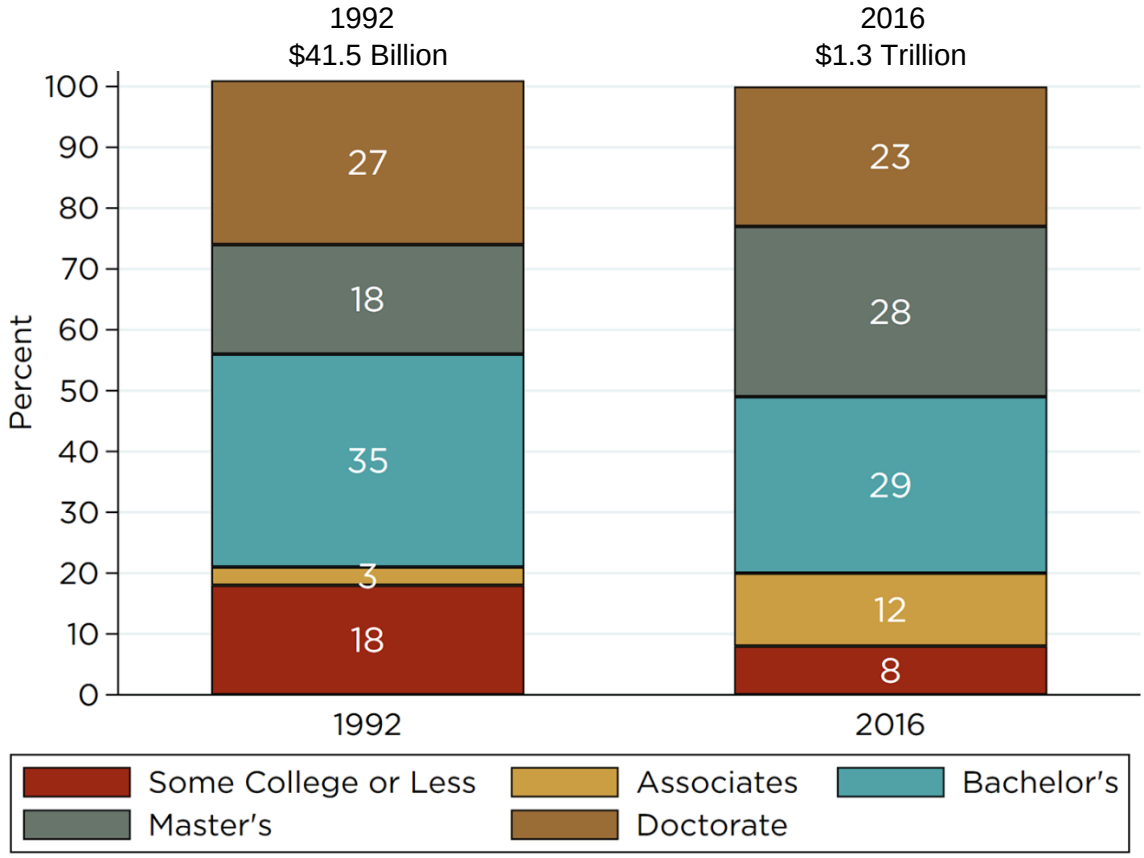
To answer research question 2, evaluating the degree to which debt is stratified, we look at the distribution of debt across levels of parental education, race/ethnicity, and gender. We first assess the increases in individual debt over the last 20 years across subgroups of students, differentiating between the probability of borrowing any amount for higher education and the amount students borrow for higher education conditional on borrowing anything. Due to skewed borrowing distributions, we log measures of educational debt when they appear as dependent variables to reduce the influence of outliers in our samples. This is consistent with other studies examining education debt as a dependent variable (e.g., Addo, Houle and Simon 2016; Houle 2014). For regression analyses, we effects-code degree programs. We report associations of conditional borrowing with each background attribute from a pooled cohort model with year interactions conditioning on race, gender, parental education, sector of institution and graduate degree type. We then focus on the most recent cohort of students to understand variation in graduate and professional student debt across levels of parental education, race/ethnicity, gender, and degree type in recent years. We use survey weights in all analyses and, when applicable, cluster standard errors at the primary sampling unit.

Finally, to answer research question 3, we explore the relationship between levels of debt and earnings. Assuming a standard repayment of 10 years at a fixed 6.8% interest rate (the interest rate imposed by Congress on student loans active during much of this time period), we then calculate hypothetical monthly and yearly payment amounts for each degree at the 50^{th} (median), 75^{th}, and 90^{th} percentiles of debt assuming workers earn the median salary in their field. Our calculations of monthly payments do not consider alternative payment structures, such as income-driven or extended repayment plans. We next divide the standard yearly payment by estimated earnings to recover the percent of estimated gross income that goes to student loan payments for those at different stages of their career. To estimate the advanced degree wage premium over bachelor's degree holders, we estimate logged annual earnings as a function of degree, age, and its quadratic, differentiated by race and ethnicity. We apply NSCG survey weights for all results.

Results

We divide our results into five subsections. We first document overall changes in graduate students' debt burden in recent years. Next, we compare master's degree students' borrowing to that of students in doctoral and professional programs and then borrowing by student background. To frame the meaning of debt changes and inequalities, we assess repayment and earnings and finally the wage premium advanced degree holders earn compared to bachelor's degree holders.

Figure 1. U.S. 1992 and 2016 household student loan debt, by highest household education attainment



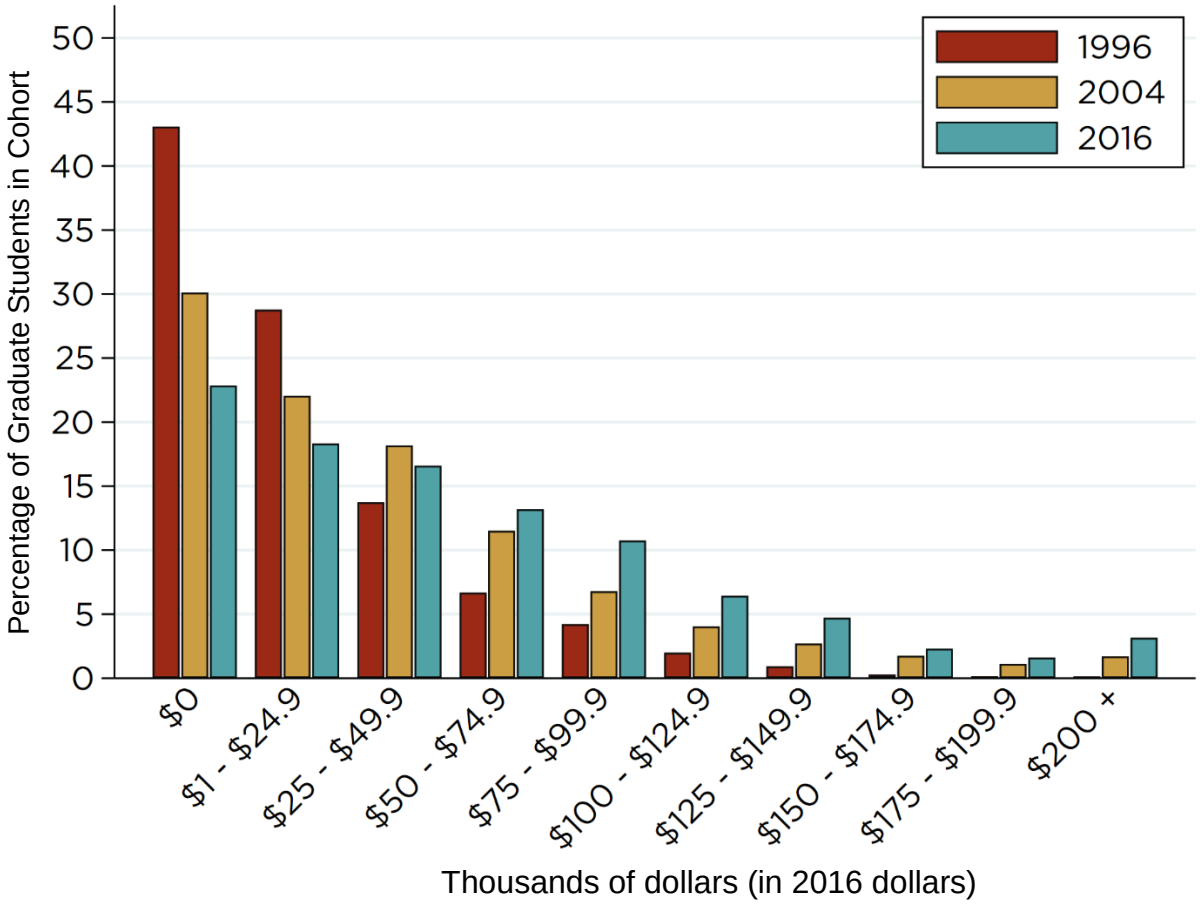
Source: Survey of Consumer Finances, 1992 and 2016. Note: SCF sampling weights applied. Numbers do not add up to 100 due to rounding. Dollar amounts are inflation-adjusted; the 1992 amount in 1992 dollars is $23.8 billion.

Overall Debt Trends

In 1992, SCF data indicate advanced degree households held 45% of the $41.5 billion of student loan debt (in real 2016 dollars), while in 2016 advanced degree households held 51% of the $1.3 trillion in debt (Figure 1). The percentage of debt held by master's degree households rose from 18% of all education debt in 1992 to 28% in 2016. Although the number of enrollees increased by about 50% in this time period (National Center For Education Statistics 2017), the dramatic increase in the total number of graduate students does not fully account for aggregate debt increases.

Turning to NPSAS data, the proportion of graduate students who did not have educational debt declined over time, from 43% in 1996 to 23% in 2016 (Figure 2). Federal loan program expansions over this period likely explain this precipitous drop in the proportion of debt-free graduate students by opening advanced degree access to more prospective students who would need loans to enroll in courses. Additionally, the proportion of students who borrowed relatively modest amounts to finance their education declined over the same period, while the proportion of students borrowing large amounts increased.

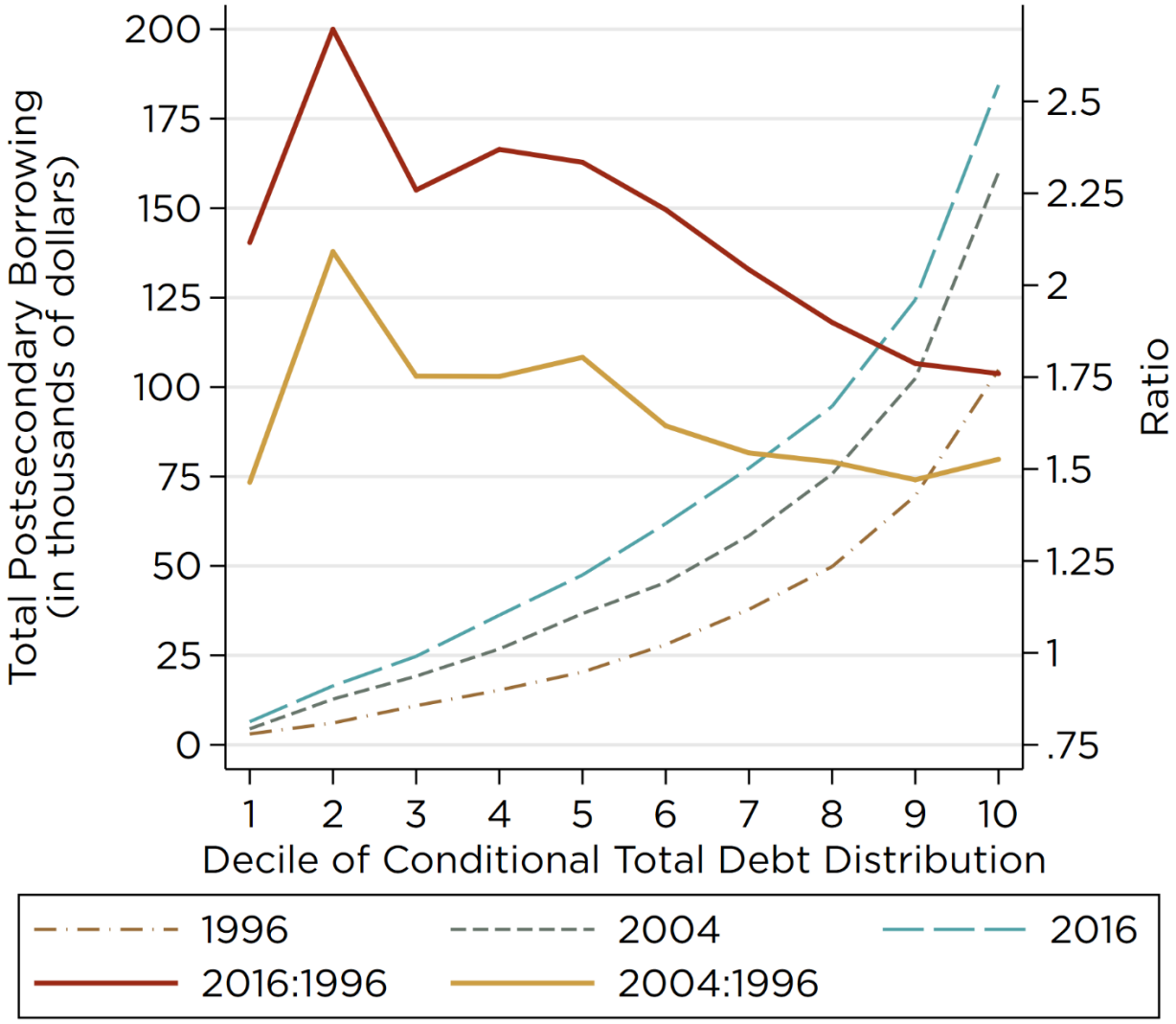
Figure 2. Graduate student borrowing trends for undergraduate and graduate education



Sources: 1996, 2004, and 2016 National Postsecondary Student Aid Study. Note: National Postsecondary Student Aid Study weights applied to cohorts.

Debt increased across the entire borrowing distribution for 1996–2016. Figure 3 shows the changing distribution of total educational debt (undergraduate and graduate) among graduate students who borrowed based on NPSAS data. The x-axis represents individuals in each decile of the borrowing distribution. Dashed lines denote real average borrowing at each decile, while the thick, solid lines indicate the ratios of 2016 and 2004 borrowing to 1996 borrowing. The left y-axis corresponds to the dashed lines, and the right y-axis corresponds to the solid lines. So, for example, at the fifth decile, 1996 and 2004 graduate students borrowed about $25,000 and $44,000 for undergraduate and graduate education, meaning the ratio of 2004 to 1996 borrowing was 1.75. In 2016, graduate students at the fifth decile borrowed about $50,000—nearly double the 1996 amounts. In fact, all deciles of graduate students in 2016 borrowed 75% or more in real dollars compared to borrowers 20 years earlier. Although proportionate increases have been greater at the bottom of the distribution than the top, the top fifth of those borrowing saw the largest real dollar increases - from $50,000 or more in 1996 to about $85,000 or more in 2016. Sharp increases in borrowing rates appear to be driven by graduate students' increased borrowing for undergraduate and graduate education across the borrowing distribution (see Appendix B).

Figure 3. Distribution of total postsecondary real-dollar borrowing among graduate students, 1996–2016



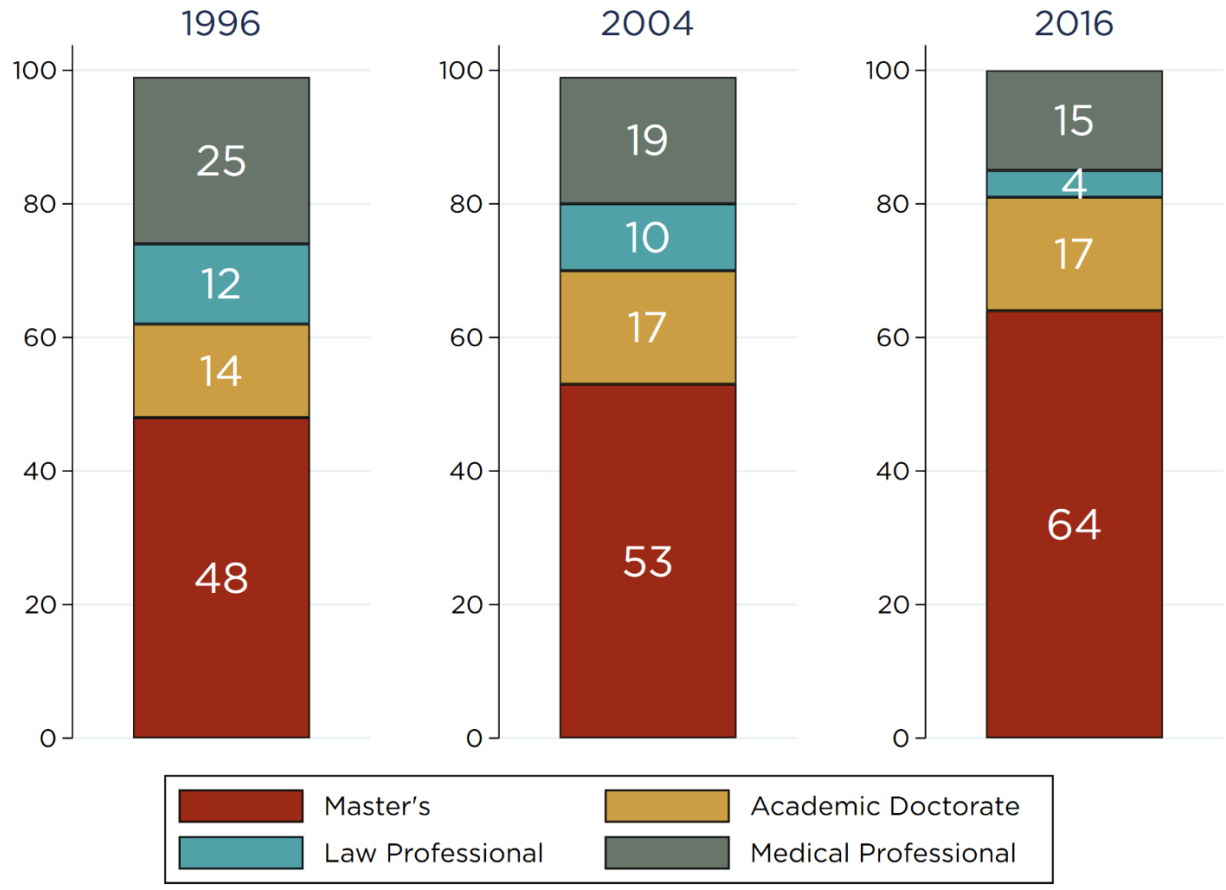
Sources: 1996, 2004, and 2016 National Postsecondary Student Aid Study. Notes: National Postsecondary Student Aid Study weights applied to cohorts. All amounts are in 2016 dollars. Patterned lines represent total borrowing and follow the left y-axis. Solid lines represent ratios and follow the right y-axis.

Borrowing by Degree Type

Figure 1 suggests that master's degree households held a growing share of student loan debt, from 18% of all household educational debt in 1996 to 28% in 2016. Turning again to the National Postsecondary Student Aid Study, we find that cohorts of students enrolled in graduate school show similar trends (Figure 4). While master's degree students carried less than half of educational debt among graduate students in 1996, they carried 53% by 2004 and 64% by 2016. Students enrolled in other degree types had stable or declining shares of total educational debt over time. These trends are due in part to higher relative enrollment in and completion of master's programs. Figure 5 displays National Center for Education Statistics' Digest of Education Statistics yearly enrollment data combined with weighted 1996, 2004, and 2016

National Postsecondary Student Aid Study proportions of students enrolled by degree type. Professional and academic doctoral degree enrollment has remained relatively stable proportionally since 1996 at roughly two hundred thousand to three hundred thousand enrollees in each year, or 10-12 percent of all graduate and professional school enrollees. On the other hand, the number of students enrolled in master's degree programs rose from 1.2 million (59 percent) in 1996 to 2.1 million (69 percent) in 2016, accounting for 82% of the growth in enrollment in this period.

Figure 4: Share of borrowing for each degree type between 1996 and 2016

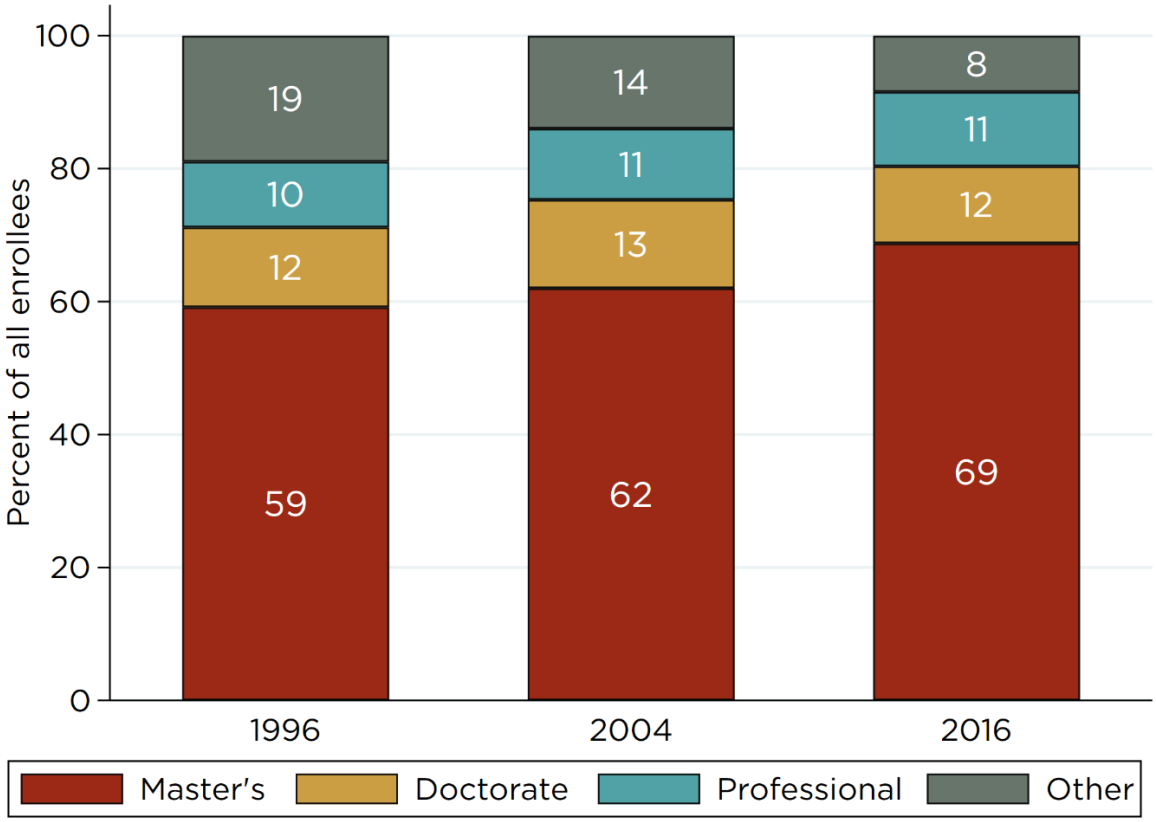


Sources: 1996, 2004, and 2016 National Postsecondary Student Aid Study. Notes: National Postsecondary Student Aid Study sample weights used for each sample year.

Borrowing by Student Background

Recent aggregate debt increases appear to be a function of large increases in graduate school enrollment and dramatic increases in borrowing for undergraduate and graduate education, particularly among those in master's degree programs. However, some students might be more affected by rising college costs than others regardless of the degree program they enter. Turning to research question 2, we assess increases in graduate student borrowing over time based on parental education level and student race and gender.

Figure 5: Total graduate and professional school enrollment from 1996 to 2016



Sources: 1996, 2004, and 2016 National Postsecondary Student Aid Study and National Center for Education Statistics' Digest of Education Statistics. NPSAS proportions using sampling weights applied to 2017 NCES-DES population data (see Table 303.80 for population numbers).

Descriptive statistics from NPSAS data displayed in Table 1 indicate that from 1996 to 2016 the share of graduate students who grew up in households with a parent with a high school degree or less decreased by half (17 percentage points), while those whose parents had some college education increased by 11 percentage points. Graduate students who were from bachelor's degree households remained relatively stable at 24% of the total, and those from master's degree or higher households increased their share of attendees by six percentage points.[1] The share of graduate students who were white over the same time period decreased by 11 percentage points, while Latinx students' representation doubled and African American students more than doubled their share of enrollment, from 6% to 14% of graduate students. Across a similar period, decennial Census and American Community Survey statistics indicate that African Americans aged 20-29 represented 14% of the age group in 2000 and 15% in 2012. Consistent with DiPrete and Buchmann (2013), we find that women increased their representation in the graduate student population from 52% of all graduate students in 1996 to 62% in 2016.

Risk of debt. From Figure 2 we observed that students in 2016 were twenty percentage points more likely to borrow than students in 1996 and seven percentage points more likely to borrow compared to students in 2004. In the first three columns of Table 2 we use NPSAS data

to report the probability of borrowing over time by student characteristics. In 1996, African American graduate students were nine percentage points more likely than white students to take out loans for undergraduate and graduate school—this disparity increased to 12 percentage points in 2016, after accounting for parental education, gender, degree type, and institutional sector. Latinx graduate students were slightly more likely than white students to take out education loans in 1996, but the difference was not statistically significant. In 2016, Latinx students were six percentage points more likely to be indebted with student loans compared to otherwise similar non-Hispanic white students. The probability of borrowing among Asian American graduate students in 1996 was not statistically distinguishable from that of their white peers, but Asian Americans were 13 percentage points less likely than white students to borrow in 2016, all else equal.

Table 1. National Postsecondary Student Aid Study Descriptive Statistics

	1996		2004		2016	
	N	%	N	%	*N*	%
Parental Education						
HS or less	570	34%	910	26%	1,830	17%
Some college	170	13%	720	18%	2,390	24%
Bachelor's	300	23%	1,070	24%	2,190	24%
Master's or higher	420	29%	1,560	31%	2,910	35%
Race/Ethnicity						
White	2,030	78%	3,260	76%	6,000	67%
African American	190	6%	390	10%	1,490	14%
Latino	130	5%	300	7%	960	10%
Asian American	200	9%	260	5%	510	6%
Other	40	2%	90	2%	370	3%
Gender						
Male	1,270	48%	1,850	40%	4,110	38%
Female	1,320	52%	2,440	60%	5,220	62%

Note: Table represents unweighted frequencies and weighted percentages.

By parental education, debt exposure trends up to 2016 appear to be driven by increases in the probability of student borrowing among families whose parents have a college education or less. Debt exposure gaps between those from the least educated families and those who had a parent with a bachelor's degree decreased from eight- percentage points in 1996 to no gap in 2016, accounting for student race, gender, degree type and sector of attendance. Conversely, the gap between those from the least and most educated families remained constant at six percentage points over these 20 years. Women also appeared to have an increased risk of going into educational debt over time. While their debt risk was similar to or lower than that of men in 1996, all else equal, they were seven percentage points more likely than men to enter into educational debt in 2016, conditional on race, parent education and degree type.

Conditional borrowing. The last three columns of Table 2 display the exponentiated coefficients for the association of each attribute with logged debt among borrowers conditional on other attributes. Based on model intercepts, a typical white male borrower who graduated

from a public university and whose parents have a high school degree or less could expect to borrow about $18,000 in 1996, $23,000 in 2004, and $28,000 in 2016, in real dollars. Debt inequalities between white and African American students *more than doubled* over time; where African American borrowers took out about 21% more than white students for undergraduate and graduate education in 1996 and 2004, they borrowed nearly 54% more than white students in 2016, conditional on parent education, gender, degree type, and sector of college or university. Latinx students borrowed about the same as white students in 1996 and in 2016, all else equal.

Students from more educated families appeared to borrow less than those from less educated families over time, conditional on borrowing anything. While borrowers from bachelor's and master's degree families took out roughly the same amount in loans as those from high school or less families in 1996, by 2016 those from master's or higher families borrowed 9% less for undergraduate and graduate education compared to students from the least educated families, all else equal. Descriptive trends not shown indicate that near-term differences by parental education are the result of everyone's debt rising - but rising faster for less-advantaged students. Women graduate student borrowers also appeared to borrow more than men over time. While women took out about as much as men for undergraduate and graduate education in 1996, they took out 24% more than men in 2016, all else equal.

In terms of degree type, debt differences appeared to shrink between some doctoral and professional degree seekers and typical borrowers over this period. Conditional on race, socioeconomic background, and gender, in 1996 students in professional health programs borrowed 285% more than the cross-program average and borrowed 225% more than the average in 2016. Debt differences stayed about the same for law professionals and shrank between academic doctorate and the cross-program average (from 141% in 1996 to 128% in 2016). Borrowers in master's of business administration programs borrowed about the same as than the cross-program average in 1996. However, they borrowed 28% less than the average in 2016, all else equal.

Debt by educational sector changed in two ways. First, 1996 borrowers attending private nonprofit institutions took out about 42% more than those attending public college, all else equal. They borrowed only 18% more than public college attendees in 2016, however - a finding consistent with the claim that subsidies in the public sector have declined. Second, while borrowing across sectors increased rapidly, borrowing in the for-profit educational sector increased the most. The difference between for-profit and public borrowers was 37% and not statistically significant in 1996, possibly due to low cell counts among for-profit attendees. Yet, those attending for-profits in 2016 took out almost 80% more than public school advanced degree seekers, all else equal. In results not shown, we find that degree type and sector of attendance are related to variation in educational debt based on race, socioeconomic background, and gender. Socioeconomic and gender debt gaps would be larger if less advantaged students and women enrolled in more expensive graduate and professional programs than those in which they enroll. We also find, consistent with Scott-Clayton and Jing (2016), that black-white debt gaps are partially explained by sector of attendance, since African American students are more likely to attend costlier private institutions (results available upon request).

Table 2. Risk of and Conditional Borrowing by Year

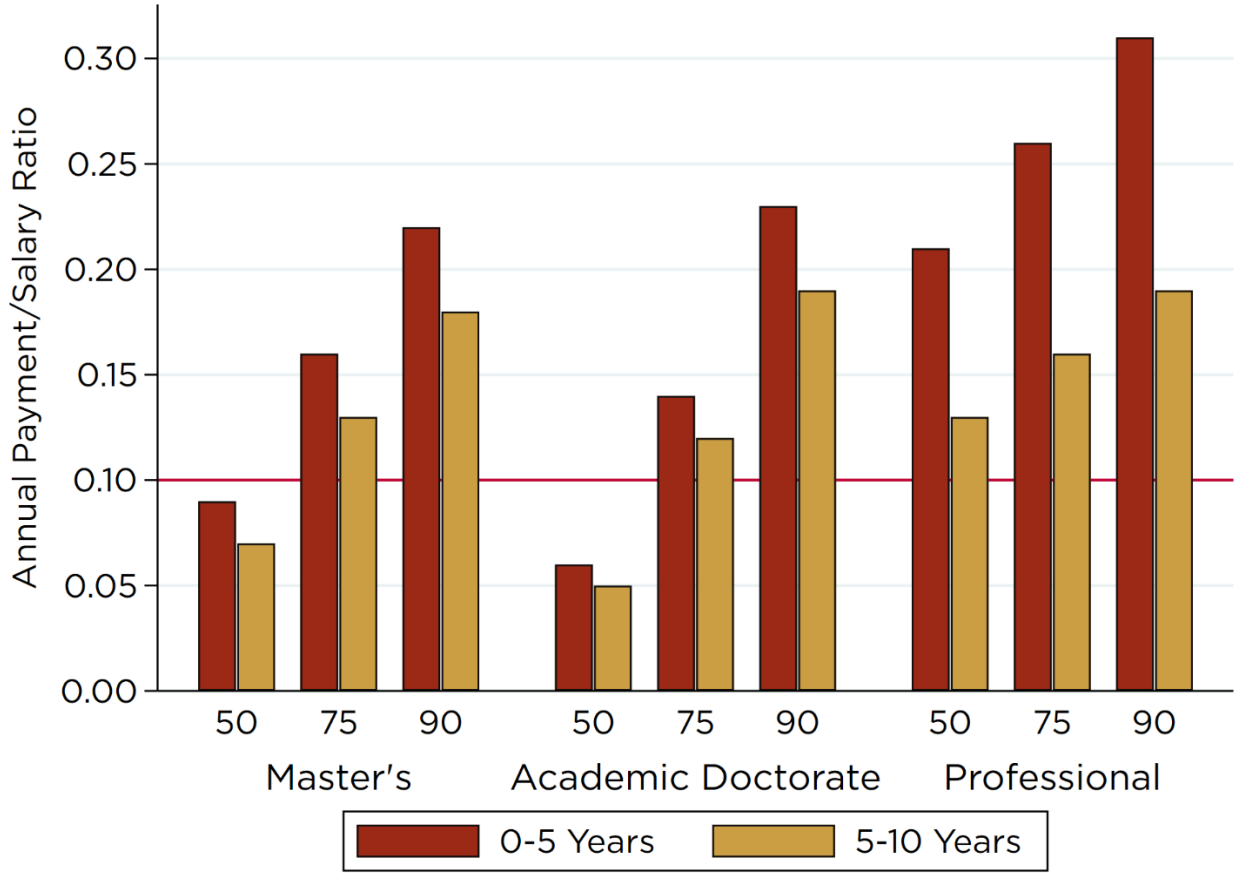
	Risk: Pr(y)=1			Conditional Borrowing: y|y>0		
	1996	2004	2016	1996	2004	2016
	(1)	(2)	(3)	(4)	(5)	(6)
Race (reference category=White)						
African American	0.09*	0.16***	0.12***	1.21	1.22***	1.54***
	(0.04)	(0.02)	(0.01)	(0.99–1.47)	(1.09–1.38)	(1.44–1.64)
Latino	0.03	0.08**	0.06***	0.96	1.15*	1.03
	(0.05)	(0.03)	(0.01)	(0.76–1.22)	(1.00–1.31)	(0.96–1.12)
Asian American	-0.04	-0.04	-0.13***	0.76*	1.06	0.83**
	(0.05)	(0.03)	(0.02)	(0.60–0.98)	(0.91–1.24)	(0.74–0.93)
Other	0.01	0.12*	0.04*	0.82	1.06	1.08
	(0.12)	(0.05)	(0.02)	(0.45–1.50)	(0.84–1.34)	(0.95–1.22)
Parental Education (reference category=high school or less)						
Some College	-0.03	0.02	0.02	0.85	1.22***	1.09*
	(0.03)	(0.02)	(0.01)	(0.71–1.02)	(1.09–1.37)	(1.02–1.17)
Bachelor's	-0.08**	-0.05*	-0.00	1.00	1.15*	0.99
	(0.03)	(0.02)	(0.01)	(0.86–1.15)	(1.03–1.27)	(0.92–1.06)
Master's or Higher	-0.06*	-0.06**	-0.06***	1.14	1.12*	0.91**
	(0.03)	(0.02)	(0.01)	(1.00–1.30)	(1.02–1.24)	(0.85–0.98)
Gender (reference category=female)						
	-0.02	0.03	0.07***	1.05	1.09*	1.24***
	(0.02)	(0.01)	(0.01)	(0.94–1.17)	(1.01–1.17)	(1.18–1.30)
Degree Type (omitted: other master's)						
Medical Doctor/ Health Professional	0.13***	0.25***	0.16***	3.85***	3.46***	3.25***
	(0.03)	(0.03)	(0.02)	(3.26–4.54)	(2.98–4.03)	(2.85–3.71)
Law Professional	0.11**	0.14***	0.09***	2.69***	2.58***	2.74***
	(0.04)	(0.04)	(0.03)	(2.23–3.25)	(2.13–3.12)	(2.38–3.15)
Academic Doctorate	-0.10*	-0.02	0.00	1.41***	1.22***	1.28***
	(0.04)	(0.02)	(0.01)	(1.15–1.73)	(1.09–1.36)	(1.19–1.37)
Master of Business Administration	-0.13**	-0.05	-0.03*	0.92	0.96	0.72***
	(0.04)	(0.03)	(0.02)	(0.74–1.16)	(0.81–1.13)	(0.66–0.79)
Master in Science, Technology, Engineering, Mathematics, or Health	-0.05	-0.01	0.04**	1.18	0.91	0.97
	(0.04)	(0.03)	(0.01)	(0.97–1.45)	(0.78–1.05)	(0.89–1.05)
Master's (Education)	-0.12***	-0.03	0.06***	0.67***	0.86*	0.85***
	(0.03)	(0.03)	(0.02)	(0.55–0.80)	(0.75–0.98)	(0.78–0.93)
Sector (ref=Public)						
Private Nonprofit	0.05*	0.05**	0.03**	1.42***	1.34***	1.18***
	(0.02)	(0.01)	(0.01)	(1.28–1.59)	(1.25–1.44)	(1.11–1.25)
Private For-Profit	0.18*	-0.03	0.09***	1.37	1.58*	1.79***
	(0.08)	(0.07)	(0.01)	(0.95–1.99)	(1.06–2.34)	(1.68–1.91)
Intercept	0.82***	0.66***	0.67***	18,035.38*** (15,328.24–21,220.64)	22,548.46*** (19,821.21–25,650.97)	27,920.00*** (25,578.14–30,476.29)
	(0.03)	(0.03)	(0.02)			
N	1,455	4,266	9,309	1,162	2,948	7,170

Note: Degree types are effects coded. * p<.05, ** p<.01 *** p<.001.

Repayment and Earnings

Are advanced degrees worth the cost in student loan debt? To answer this question, we turn to 2013 National Survey of College Graduates data for the remainder of the analyses. Average debt among borrowers for 2009–13 master's ($50,371) and academic doctorate ($51,154) degree earners is quite similar to that of the 2012 National Postsecondary Student Aid Study counterparts. The 2013 survey reports professional degree holder debt of $97,680, while the 2012 study reports $110,000, a difference likely due to the 2013 survey's limited upper bound of reporting categories. Given the concerns about the accuracy of self-reports of debt (Brown et al. 2015), we find these results reassuring.

Figure 6. Payment to Salary Ratio at the 50th, 75th, and 90th percentiles of borrowing and median salary, by degree type



Source: National Survey of College Graduates: 2013. NSCG sampling weights applied to estimate results.

In these data, among advanced degree graduates who recently borrowed, logged salary and logged debt are virtually uncorrelated (r=.01). The amounts advanced degree holders earn with their degrees does not appear to be contingent on how much they borrow, although others have found that earnings are influenced by debt (Chapman and Lounkaew 2015). To account for the range of debt-to-earnings ratios graduates might expect, we report the ratio of annual median, 75th percentile, and 90th percentile payment to estimated annual median salary for each degree type throughout the standard payment period of 10 years (Figure 6). The horizontal line at 0.10

on the y-axis refers to Federal Student Aid's (2018) recommended maximum payment-to-earnings ratio for those in repayment, which is also the proportion of discretionary income devoted to educational loans for those on income-driven repayment plans. FSA (2018) also reports that repayment percentages of 20% of income or greater typically denote excessive debt burden and risk of loan default.

Half of master's and academic doctoral degree holders who took out student loans appear to have reasonably low repayment burdens, assuming their salaries in the first 10 years of their career are at the median or higher for their degree type. However, at the 90th percentile of the debt distribution, master's degree and academic doctoral degree-holding borrowers would spend over 20% of their annual incomes during the first five years of their careers on student loans if they earn at the median for their degree type. In the next five years of their career, assuming they maintain median earnings, these students would devote 17% and 19% of their incomes to student loans. Professional degree-holding borrowers can expect to have greater debt burdens than master's and academic doctoral degree holders in the first 10 years of their careers. Median professional degree-holding borrowers in the first five years of their careers could expect to devote 20% of their salaries to student loans if earning at the median for professional degrees, while those at the 90th percentile of borrowing could expect to devote over 30% of their salaries to student loan debt. Their expected debt burdens are substantially less severe in the next five years of their careers, due to expected salaries nearly doubling over the first five years of their career.

The Advanced Degree Wage Premium

Finally, given the large amount of debt held by African American students, we focus mainly on returns to graduate education by race. However, we also discuss wage premia by parental education and gender in Appendix A. Recall that in general the graduate degree wage premium has risen faster than the college-only wage premium over the past few decades (Valletta 2016). African American and Latinx students may enjoy a greater return to advanced credentials than non-Hispanic white students, thus justifying their greater willingness to take on debt. To investigate these possibilities, we used National Survey of College Graduates data from 2013 to regress logged wages on age and its quadratic and a series of pairwise race by degree-type interactions.

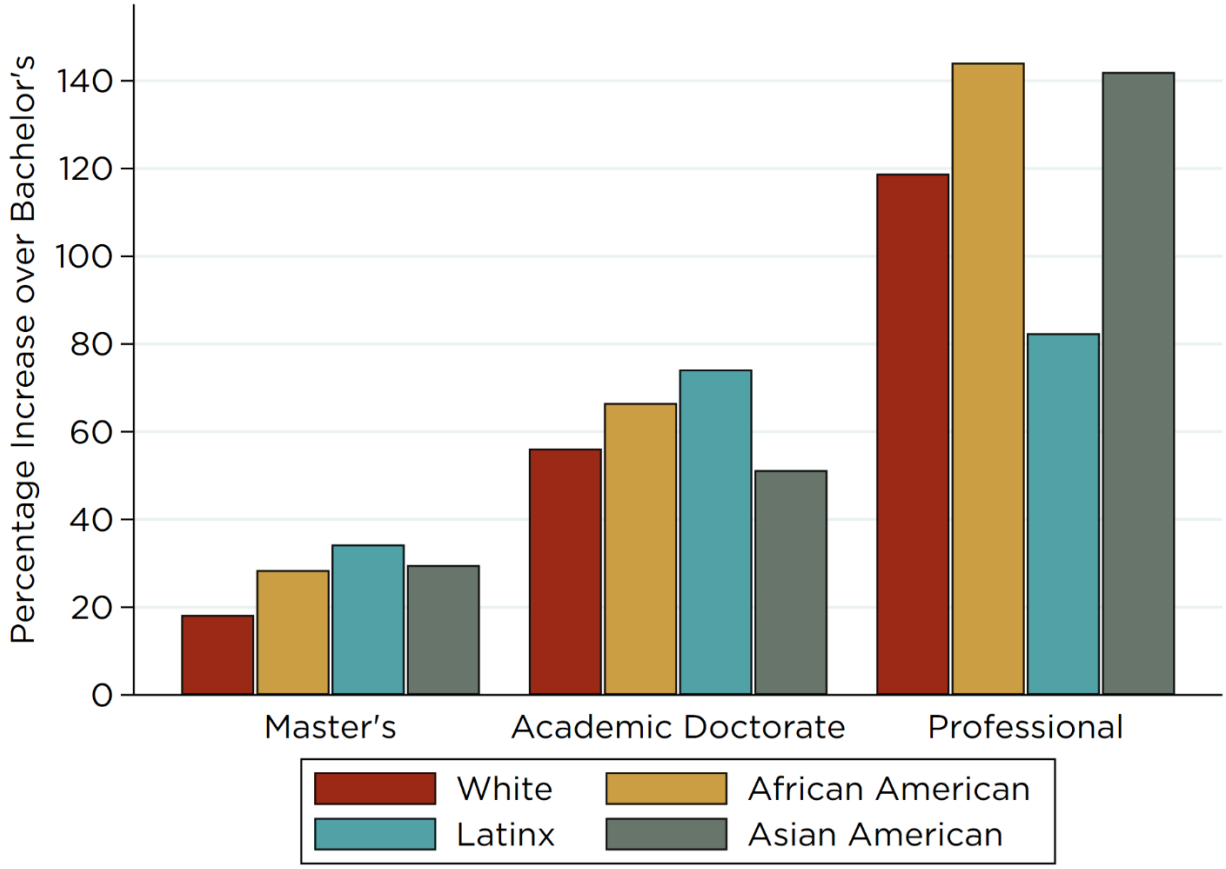
Model results indicate that across degree level and type, typical white and Asian American degree holders earn more than their African American and Latinx counterparts (Table 3). White bachelor's, academic doctoral and professional degree holders earn roughly $7,000 more than African American peers. The gap is smaller between white and African American master's degree holders by comparison to any of those groups (~$2,000 less).

Table 3. Estimated Median Wages by Degree Type and Characteristics of Graduates

	Bachelor's	Master's	Academic Doctoral	Professional
Race/Ethnicity				
White	$ 46,707	$ 55,216	$ 72,936	$ 102,214
African American	$ 39,607	$ 50,877	$ 65,965	$ 96,691
Latinx	$ 39,513	$ 53,066	$ 68,834	$ 72,098
Asian American	$ 48,139	$ 62,384	$ 72,809	$ 116,504
Parent Education				
High school or less	$ 46,147	$ 52,889	$ 73,248	$ 110,709
Some college	$ 45,414	$ 55,167	$ 66,305	$ 94,187
Bachelor's	$ 45,279	$ 55,475	$ 71,710	$ 92,551
Master's or more	$ 45,561	$ 57,890	$ 71,815	$ 104,880
Gender				
Male	$ 56,235	$ 69,283	$ 84,951	$ 121,932
Female	$ 37,016	$ 44,324	$ 61,315	$ 83,611

Graduate degree wage premia appear to be higher for African American students than for white or Asian American students. Figure 7 displays differences within race between typical bachelor's and advanced degree holder wages using the recovered marginal associations from the above model. Compared to African American bachelor's degree graduates, African American master's degree graduates earned about 29% more per year on average, about a third more than the relative premium for white master's degree holders. African American academic doctoral students earned 66% more on average, and African American professional degree holders earned 142% more on average than African American bachelor's degree holders – greater relative gains than whites and on-par with the large median wage premium for Asian American professional degree-holders. In each case, relative advanced degree wage premia are greater for African American than for white graduate students.

Figure 7. Advanced degree wage premium by race and ethnicity



Source: National Survey of College Graduates: 2013. NSCG sampling weights applied to estimate results.

Discussion

We have presented five key empirical findings in this paper:

1. The likelihood of entering into debt for graduate/professional education has risen over the past 20 years across the board.
2. Levels of education debt among graduate and professional degree earners over this period have increased from a factor of over 2.25 for those borrowing the least to 1.75 for those borrowing the most.
3. The prevalence of master's degrees has also increased over time, both in the share of graduate/professional degrees awarded and share of aggregate debt accounted for by recipients.
4. Both the risk of debt and the level of debt among debtors has increased most markedly for African Americans and for women net of institutional sector, degree type and broad field of study.

5. Relative wage premia for graduate and professional degrees favor African Americans over non-Hispanic whites at every level and women over men at the academic doctorate and professional levels. Real expected earnings, however, favor non-Hispanic whites and men at every level.

What do these patterns suggest about present and future trends in social stratification? We suggest two complementary explanations for increases in graduate professional student debt overall and among African American students in particular. An institutional explanation points to a confluence of financial constraints imposed on universities, policy decisions around the financing of graduate and professional education and changes in the returns to higher education. This perfect storm of circumstances has led to sharp increases in levels of educational debt among those earning graduate and professional degrees, particularly for those from less economically advantaged families. At the individual level, Rachel Dwyer's work on the role of credit and debt in processes of social stratification offers some insights (Dwyer 2018). While Dwyer points to differences in access to (and terms of) credit that may hinder the upward mobility prospects for those in or near poverty, in the present context the issues is less about access than it is about how much debt professionals of color must incur to arrive at their destination.

The Institutional Explanation

The institutional explanation for increasing debt burdens among graduate and professional students rests on two assertions. The first assertion is that administrators in public higher education do their best to maximize revenues for their institutions. In the face of obstacles to one avenue (e.g. declining state appropriations) they will pursue other avenues (e.g. raising tuition and fees, growing enrollment in revenue-generating courses of study and producing new revenue-generating credential programs). The second assertion is that the federal and local governments view graduate education almost entirely as a private good and thus are unwilling to subsidize it with grant funds in the same way they are willing to subsidize undergraduate education. We discuss each below.

Higher education administrators. Among public four-year institutions, per-student state and local appropriations declined by 19% between 2004 and 2014 while net tuition revenue per student increased by 42% (Baum et al. 2018, Table 2). Compounding this decline, fourteen states had imposed either a cap on increases or a freeze on tuition and fees in at least some parts of their public higher education systems as of 2018 and a handful of states were considering enacting legislation to do so at that time (Kelchen and Pingel 2018).

How should leaders in public higher education respond to these constraints? Like the community college leaders Dougherty described in his 1994 book *The Contradictory College*, we suggest that these leaders act as (increasingly) constrained entrepreneurs. They wish to maximize enrollments and revenue to sustain and perhaps even expand their organizations. One obvious path in states where they have not been prohibited from doing so is to raise undergraduate tuition and fees. The capacity of institutions to compensate for declining state resources, and the net decline in state support, varies appreciably across states and institutions.

Webber (2017) estimates that a $1,000 decline in state appropriations results in a $257 increase in tuition and fees, on average. This average, though, masks variation across states in institutional capacities to shift their costs to students.

Another avenue public college and university leaders might pursue to increase their revenues is to expand their out-of-state and international enrollments (Bound et al. 2016). Legislatures and the broader public seem to care less about out-of-state than in-state tuition and fees and might tolerate expansion in out-of-state enrollment so long as they do not perceive it to impinge upon the opportunities of in-state students to attend. Bound and colleagues (2016) estimate that a 10% reduction in state appropriations contributed to an increase of 12% to 17% in foreign enrollment between 1996 and 2012. Jaquette and Curs (2015) show that state universities, particularly research universities, also seek to expand their domestic out-of-state enrollments, though Bound and colleagues assert that such strategies have limited impact.

Finally, higher education leaders might seek to increase their revenue from graduate and professional degree programs. They could do so by creating new programs, expanding existing programs or increasing tuition and fees. Although the evidence on new programs is thin, some empirical work suggests that at least the number of master's programs has expanded appreciably, from 289 to 514 distinct degrees between 1995 and 2017 (Blagg 2018). Evidence on expansion of existing graduate programs is clearer (Posselt and Grodsky 2017); graduate and professional enrollments increased by 36% between 2000 and 2010 but only 1% between 2010 and 2016 (National Center for Education Statistics 2018). Increases in enrolment over this period were particularly pronounced for African Americans (Blagg 2018; Scott-Clayton and Li 2016).

It's difficult to provide precise estimates of changes in net revenues due to graduate and professional degree programs. Like charges for undergraduate education (albeit to a lesser degree), charges for graduate and professional education are sometimes partially offset by institutional aid. To make matters more complicated, tuition and fees vary substantially across graduate degree levels, fields of study and sectors of higher education. Although proportionate changes in tuitions and fees for graduate and professional education track changes in undergraduate sticker prices on average (Baum and Steele 2018), the percentage change comes off of an appreciably higher base (Jaquette 2019).

State and post-baccalaureate funding. There are relatively limited grant funds for professional education or master's programs in general, and certainly nothing like a Pell grant for graduate and professional education. Instead, the burden of paying for graduate and professional education, with the exception of academic doctorates, falls largely on students and their families. Students typically pay for their professional and master's degrees through a mix of earnings and federal loans. African American students attending public and private not-for-profit institutions for their graduate degrees tend to pay more—more from earnings and more from loans (Baum and Steele 2018). They are also much more likely to attend for-profit institutions that typically cost more than other options (Scott-Clayton and Li 2016). The combination of (sometimes sharp) increases in graduate and professional tuition and fees and limited grant resources to offset these charges sets up potentially high barriers to graduate degree attainment for prospective students and imposes a large debt burden on those who choose to surmount these barriers.

The Individual Explanation

While many express concerns over the amount of educational debt students incur, borrowing for higher education credentials has for the most part been regarded as a sound investment given the market (Webber 2016) and non-market (Heckman, Humphries and Veramendi 2017) returns to a college degree. The market returns to graduate and professional degrees may be even higher, as discussed above.

In her framing of credit and debt, Dwyer (2018) argues that credit can be an important resource for achieving or maintaining high social and economic status. The terms under which access to credit is governed, Dwyer notes, tend to reproduce social inequalities, with those from more advantaged backgrounds enjoying greater access to credit under substantially more favorable terms (lower interest rates, lesser expectations for collateral). Credit markets for graduate and professional education, however, are generally equitable. Student debt is not secured by property and Stafford loans have rates of interest that are not tied to the borrower's credit history or social background. Starting in 2006, borrowing limits for graduate and professional students become much more generous, contributing to a fairly loose credit market.

What we cannot observe in the data we have is how much money students secure from other sources to pay for their graduate or professional education. In fact, we know very little about the role parents, grandparents and other kin play in financing students' graduate or professional degrees. Absent this information, we cannot say with certainty why African American students borrow more for their education than non-Hispanic white students - even net of parental education, degree program and school sector. What we can observe, however, is that their debt burdens are substantially higher than those of non-Hispanic whites, even net of all of these factors. It is not access to credit that thwarts the mobility of African America graduate and professional degree earners; it is the degree of debt they must assume to earn their degrees. The historically high levels of debt incurred by those earning graduate degrees may inhibit their ability to support their children's educational expectations, contributing to the well-documented fragility of the black middle class (Houle and Addo 2018; Landry and Marsh 2011).

The Exclusionary Power of Educational Debt

Our study of graduate debt focuses exclusively on the population of students who attended graduate or professional school. It is possible, even likely, that doing so substantially understates the impact that prospective graduate debt has on the upward mobility of college graduates. We cannot assess how graduate debt affects the enrollment choices of prospective students and thus deters them from pursuing more lucrative careers beyond those available to baccalaureate earners. It may be that debt is an important closure mechanism in restricting the flow of African American and first-generation college students into fields or positions that require graduate or professional degrees.

There are few empirical studies that can speak to the exclusionary power of graduate and professional student debt. Boatman, Evans and Soliz (2017) study debt aversion among high school seniors, community college students and non-enrolled adults, finding that roughly 20% to 40% of respondents are loan-averse. They do not find that loan aversion varies as a function of

family income, nor do they find consistent evidence that African American respondents are more or less averse than non-Hispanic white respondents. The study, however, was intended to estimate loan aversion among undergraduates and invoked loans that were much smaller than those held by the typical graduate or professional student.

Conclusion

In this paper, we explored the ways in which trends in graduate school debt inform understandings of contemporary social stratification. Aggregate student borrowing has increased across the board in the last twenty years and a confluence of individual and institutional circumstances in higher education have likely contributed to a perfect storm of borrowing for advanced degrees. The extent to which explanations for debt increases generate from institutional, supply-side sources or from individual decisions and motivations is an open question that we cannot address with our data. We encourage future avenues of research in this area to follow the many potential theoretical sources for trends we observe among advanced degree seekers. This will likely include studies tracking graduate students while they were undergraduates and those tracking students through to their long-term experiences in the labor market as they save, consume, form families and prepare for retirement.

Although we study an already highly-educated population with promising earning potential, the inequalities in debt levels we document across race, socioeconomic background and gender are substantial. Patterned differences in educational debt carried by groups of graduate and professional students inform our interpretations of the returns to advanced degrees, which we find are typically more, but not entirely, equitable as education level increases. Variation in the relative economic returns to degrees may thus partially reduce the impact of debt disparities on social inequality.

Particularly, patterns of debt and wage premia we observe by race add nuance to discussions around educational and wealth inequality. The increase in the number of African American college graduates earning graduate credentials in many ways signals real progress in reducing black-white disparities in economic and educational opportunities. At the same time, inequalities in educational debt may serve as a drag on this process, contributing to the perpetuation of inequalities in wealth by race (Houle and Addo 2018; Killewald and Bryan 2018). Education debt may also limit the relative capacity of African American parents to support their children's (likely high) educational aspirations and/or to leave bequests consistent with their lifetime income trajectories, contributing to the well-documented rates of downward mobility for children of economically successful African American parents (Chetty et al. 2018; Hertz 2003). We hope future research with better data will be able to help us understand the extent to which trends in opportunity and debt burden shape the capacity of the African American middle and upper class to enjoy the same advantages as whites with comparable levels of educational, occupational and economic attainment.

Research Ethics

An institutional review board approved the research conducted on human subjects used for this manuscript, and this research was carried out in a way that is consistent with the ethical standards

articulated in the 1964 Declaration of Helsinki and Section 12 of the American Sociological Association Code of Ethics. Adequate steps have been taken to protect participants' confidentiality.

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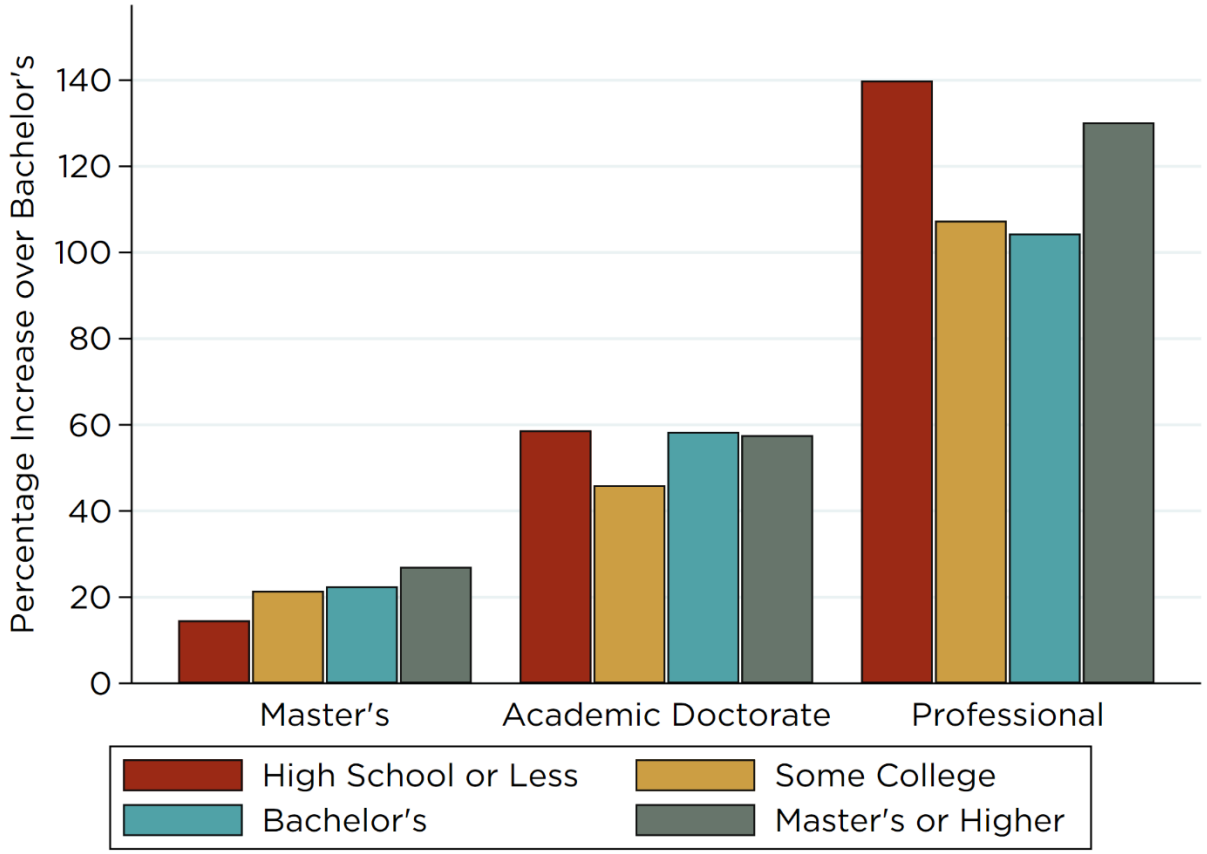
Appendix A. Advanced Degree Wage Premia by Parent Education and Gender

Differences in median bachelor's degree earnings are negligible across levels of parental education, with each group earning–roughly $45,000. However, master's degree graduates from more educated families tended to earn more at the median than those from less-educated families. While master's degree holders whose parents had a high school degree or less earned $53,000 at the median, those whose parents had a master's degree or higher earned about $58,000 at the median. This trend flips at the academic doctoral and professional levels, where those from the least-educated families tend to earn more at the median than their more-advantaged counterparts. By gender, men tend to earn more than women at every degree level. The median gender gap in earnings is about $19,000 among bachelor's degree holders, $25,000 among master's and academic doctoral degree holders, and $38,000 among professional degree holders.

Figure A1. Advanced Degree Wage Premia Relative to Bachelor's Degree Wages by Parents' Highest Education

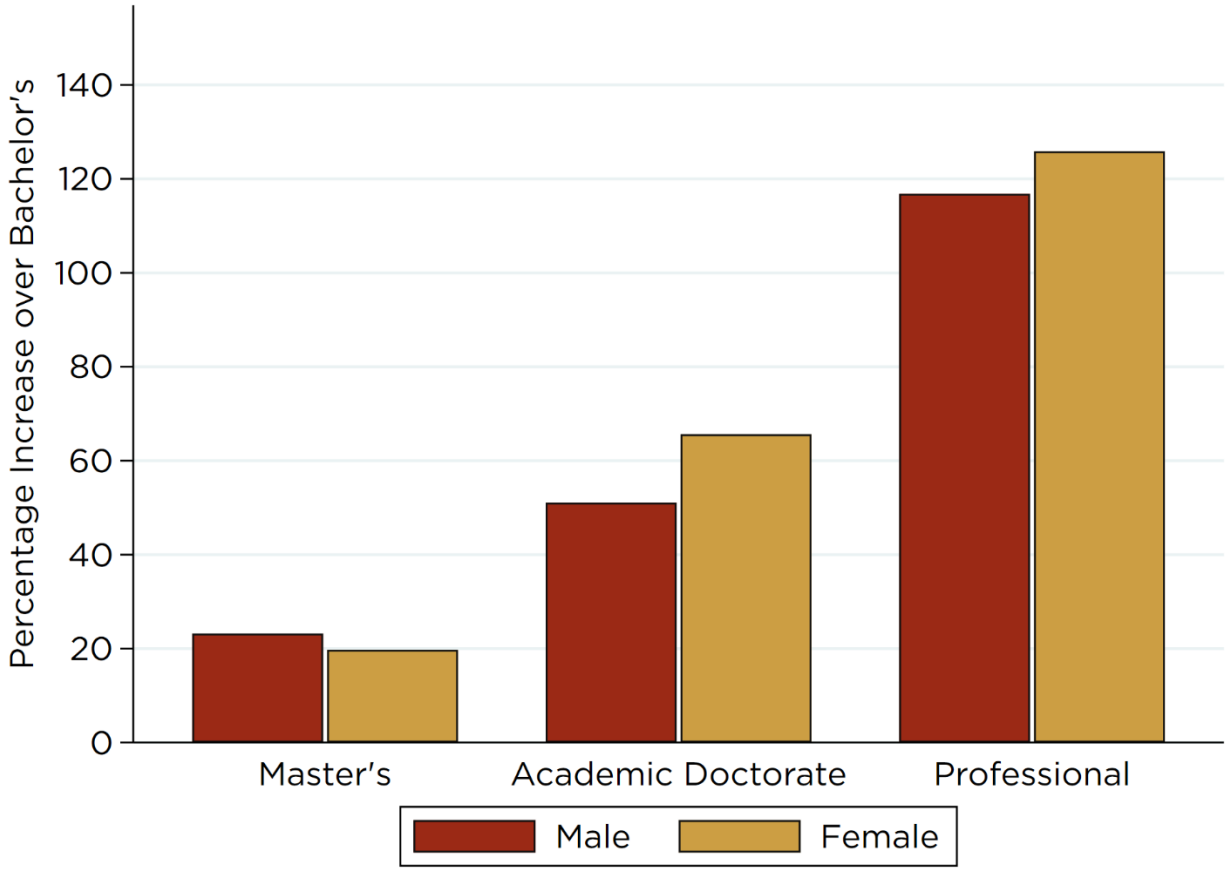


Source: National Survey of College Graduates: 2013. NSCG sampling weights applied to estimate results.

By parents' highest degree earned, master's degree wage premia appear to favor graduates from more-educated families. The relative advantage of a master's degree over a bachelor's degree is about 12% for those whose parents earned a high school degree or less. The advantage jumps to a 21% premium for those whose parents attended some college or earned a bachelor's

degree and to 28% among those whose parents earned a master's degree or higher. Socioeconomic gaps in relative wage premia over a bachelor's degree largely equalize at the academic doctorate level, where those from the least and most educated families earn almost 60% more than their bachelor's degree earning counterparts. At the professional degree level, those from the least-educated families enjoy the greatest relative wage premium advantage, seeing wages 140% higher than their bachelor's degree counterparts.

Figure A1. Advanced Degree Wage Premia Relative to Bachelor's Degree Wages by Gender



Source: National Survey of College Graduates: 2013. NSCG sampling weights applied to estimate results.

By gender, master's degree wage premia benefit men slightly more than women (a 22% vs. 20% relative median wage premia over bachelor's degree counterparts, respectively). At the academic doctorate and professional levels, relative wage premia benefit women more than men. Women with an academic doctorate have median earnings about 65% higher than their peers with bachelor's degrees, while similar increases are 50% among men with the same degree. Women with a professional degree earn about 125% more at the median than women with bachelor's degrees. Men with the same general type of degree earn about 117% more at the median compared to men with bachelor's degrees.